

1 Amendment to the Claims

2 In the Claims:

3 Please cancel Claims 20-27.

4 Please amend Claims 1, 7, 13, 15, 18 and 19; and add new Claim 28, as follows:

5 1. (Currently Amended) An automated sequential reaction system for automatically and
6 sequentially producing a substance library of different desired chemical products from a plurality of
7 reactants in accord with a programmed series of steps, comprising:

8 (a) a first automated reactant supply comprising a plurality of separate reactant
9 chambers, each adapted to be filled with a different reactant;

10 (b) a first supply valve that is automatically actuatable and is connected to the first
11 automated reactant supply to select a first desired reactant from among the plurality of separate
12 reactant chambers;

13 (c) a reaction module coupled in fluid communication with said first supply valve,
14 ~~such that~~ such that a reactant chamber selected from within said automated reactant supply by the
15 first supply valve is placed in fluid communication with said reaction module, said reaction module
16 including a general purpose chemical reactor that is operable to produce the substance library of
17 different desired chemical products from the plurality of reactants, the general purpose reactor being
18 configured to operate continuously over a period of time, such that a volume of a desired product
19 produced by the general purpose reactor is a function of both a flow rate associated with the plurality
20 of reactants introduced into the general purpose reactor, and a length of time during which the
21 plurality of reactants are continuously introduced into the general purpose reactor, as opposed to a
22 volume of a reactor operating in a batch mode;

23 (d) an output valve that is automatically actuatable and is coupled in fluid
24 communication with the reaction module to receive a desired chemical product, said desired chemical
25 product contributing to the substance library of different desired chemical products;

26 (e) an automated product collector in fluid communication with said output valve
27 to receive the desired chemical product and comprising a plurality of product chambers, each product
28 chamber being adapted to be filled with a different desired product to produce the substance library
29 of different desired chemical products; and

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1 (f) a system controller controllably connected to the first automated
2 reactant supply, the first supply valve, the reaction module, and the automated product collector, said
3 system controller being programmed to monitor and control production of the plurality of desired
4 chemical products by the automated sequential reaction system, including controlling the first supply
5 valve to select the first desired reactant, controlling said reaction module to automatically produce the
6 desired chemical product from the first desired reactant, and controlling the output valve to select a
7 product chamber into which the desired product is directed.

8 2. (Original) The automated sequential reaction system of Claim 1, wherein said automated
9 reactant supply further comprises a solvent supply, said solvent supply being adapted to be filled with
10 a solvent for flushing said sequential reaction system, said solvent supply being selectively placed
11 into fluid communication with the reaction module by the first supply valve under control of the
12 system controller, to enable a solvent to flow from said solvent supply into said reaction module.

13 3. (Original) The automated sequential reaction system of Claim 2, wherein said automated
14 product collector further comprises a spent solvent reservoir, said spent solvent reservoir being
15 adapted to contain a spent solvent that has been used to flush said sequential reaction system, said
16 spent solvent reservoir being selectively placed into fluid communication with the reaction module by
17 the output valve under control of said system controller, to enable a spent solvent to flow from the
18 reaction module into said spent solvent reservoir.

19 4. (Original) The automated sequential reaction system of Claim 1, further comprising a
20 separate solvent supply that is selectively placed in fluid communication with said reaction module
21 by said first supply valve, under control of the system controller, to enable a solvent to flow from said
22 separate solvent supply into said reaction module.

23 5. (Original) The automated sequential reaction system of Claim 4, further comprising a
24 separate spent solvent reservoir, said separate spent solvent reservoir being adapted to contain a spent
25 solvent that has been used to flush said sequential reaction system, said spent solvent reservoir being
26 selectively placed into fluid communication with the reaction module by the output valve under
27 control of said system controller, to enable a spent solvent to flow from the reaction module into said
28 spent solvent reservoir.

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1 6. (Original) The automated sequential reaction system of Claim 4, further comprising an
2 automated detector disposed between the output valve and the reaction module and coupled to the
3 system controller, said automated detector providing an output signal to the system controller that is
4 indicative of whether a spent solvent or a desired chemical product is flowing from the reaction
5 module, said system controller responding to the output signal to actuate the output valve to:

6 (a) selectively couple the reaction module in fluid communication with the
7 automated product collector if the output signal indicates that a desired product is flowing from the
8 reaction module; and

9 (b) selectively couple the reaction module in fluid communication with the spent
10 solvent reservoir if the output signal indicates that a spent solvent is flowing from the reaction
11 module.

12 7. (Currently Amended) The automated sequential reaction system of Claim 1, further
13 comprising a heat exchanger controllably connected to said system controller, said heat exchanger
14 ~~being coupled in fluid communication with the reaction module and providing a temperature~~
15 ~~conditioned fluid that circulates through the reaction module, enabling~~ configured to enable the
16 system controller to control a temperature within said reaction module.

17 8. (Original) The automated sequential reaction system of Claim 7, wherein said heat
18 exchanger is disposed within said reaction module.

19 9. (Original) The automated sequential reaction system of Claim 1, further comprising a
20 pump having an inlet in fluid communication with said supply valve, and an outlet coupled in fluid
21 communication with an inlet to the chemical reactor, said pump being controllably connected to said
22 system controller to enable control of a flow of a first desired reactant into the chemical reactor.

23 10. (Original) The automated sequential reaction system of Claim 1, wherein the reaction
24 module includes a residence time chamber in fluid communication with an outlet of the chemical
25 reactor, said residence time chamber providing additional time for a desired chemical product to be
26 produced and having an outlet coupled in fluid communication with the output valve.

27 11. (Original) The automated sequential reaction system of Claim 1, wherein said chemical
28 reactor comprises a microreactor.

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1 12. (Original) The automated sequential reaction system of Claim 1, wherein said system
2 controller includes a memory, a processor, and a user interface, said memory storing machine
3 instructions that define the automated sequence of steps and which are executed by the processor to
4 effect automatic control of the automated sequential reaction system.

5 13. (Currently Amended) The automated sequential reaction system of ~~Claim 12~~ Claim 9,
6 wherein said ~~system controller comprises a personal computer~~ outlet valve comprises a proportional
7 valve configured to act as a throttle to enable a pressure along a reaction path to be selectively varied.

8 14. (Original) The automated sequential reaction system of Claim 1, further comprising a
9 second supply valve, and a second automated reactant supply, said second automated reactant supply
10 comprising a plurality of separate reactant chambers, each adapted to be filled with a different
11 reactant, said second supply valve being automatically actuatable and connected to the second
12 automated reactant supply to select a second desired reactant from among the plurality of separate
13 reactant chambers included therein under control of said system controller, said first desired reactant
14 and said second desired reactant being supplied to the reaction module to produce the desired
15 product.

16 15. (Currently Amended) An automated sequential reaction system for sequentially
17 producing a plurality of different chemical products using selected desired reactants from among a
18 plurality of different reactants, comprising:

19 (a) a first automated fluid supply comprising a plurality of first separately
20 addressable volumes that are selectively coupled in fluid communication with a first outlet, each
21 volume being adapted to contain a different reactant;

22 (b) a second automated fluid supply comprising a plurality of second separately
23 addressable volumes that are selectively coupled in fluid communication with a second outlet, each
24 volume being adapted to contain a different reactant;

25 (c) a chemical reactor in fluid communication with said first outlet to receive a
26 first desired reactant therefrom and with said second outlet to receive a second desired reactant
27 therefrom, said chemical reactor being generally configured for sequentially producing the plurality
28 of different chemical products by reacting successive different first and second desired reactants, said
29 chemical reactor being configured to operate continuously over a period of time, such that a volume
30 of any specific chemical product produced by said chemical reactor is a function of both a flow rate

1 associated with specific reactants introduced into said chemical reactor in order to produce the
2 specific chemical product, and a length of time during which the specific reactants are continuously
3 introduced into said chemical reactor, as opposed to a volume of a reactor operating in a batch mode;

4 (d) a solvent supply adapted to contain a solvent and selectively provide the
5 solvent to the chemical reactor for flushing the chemical reactor after each of the plurality of different
6 chemical products has been produced thereby;

7 (e) an automated fluid collector comprising a plurality of separate fluid volumes,
8 each fluid volume being selectively coupled to the chemical reactor to receive a different chemical
9 product therefrom;

10 (f) a spent solvent reservoir that is selectively coupled in fluid communication
11 with the chemical reactor, to receive a spent solvent that was used for flushing the chemical reactor
12 after each different desired chemical product has been produced thereby; and

13 (g) a system controller controllably connected to the first automated fluid supply,
14 the second automated fluid supply, the solvent supply, the chemical reactor, the spent solvent
15 reservoir, and the automated fluid collector, said system controller being programmed to monitor and
16 control production of each of the plurality of different desired chemical products by the automated
17 sequential reaction system, including controlling the first automated fluid supply to select the first
18 desired reactant, controlling the second automated fluid supply to select the second desired reactant,
19 controlling the chemical reactor to automatically produce each successive different desired chemical
20 product from successive first and second desired reactants, controlling the automated fluid collector
21 to direct each different desired chemical product into a different fluid volume, and controlling the
22 solvent supply and the spent solvent reservoir so as to flush the chemical reactor after the production
23 of each different desired chemical product, and collect the spent solvent used to flush the chemical
24 reactor after the production of each different desired chemical product, such that the chemical reactor
25 is operated in a continuous mode as opposed to a batch mode, the controller establishing a flow rate
26 for each reactant introduced into the reactor, where the flow rate is selected based on a reaction time
27 required, where reactants are fed into the chemical reactor at a relatively higher flow rate to
28 accommodate reactions requiring a relatively short reaction time, and reactants are fed into the
29 chemical reactor at a relatively lower flow rate to accommodate reactions requiring a relatively
30 longer reaction time.

1 16. (Original) The automated sequential reaction system of Claim 15, further comprising a
2 pump in fluid communication with said first outlet of said first fluid supply, with said second outlet
3 of said second fluid supply, and with said chemical reactor, said pump being controllably connected
4 to said system controller, which controls a flow rate of the first and second desired reactants through
5 said automated sequential reaction system with the pump.

6 17. (Original) The automated sequential reaction system of Claim 15, further comprising a
7 residence time chamber in fluid communication with an outlet of said chemical reactor, said
8 residence time chamber providing additional time for a chemical product to be produced and having
9 an outlet coupled in fluid communication with the automated fluid collector and the spent solvent
10 reservoir.

11 18. (Currently Amended) The automated sequential reaction system of Claim 15, further
12 comprising a detector in fluid communication with an outlet of said reactor[;], said detector
13 producing a signal indicative of the type of fluid being discharged, said detector being controllably
14 connected to said system controller[;], said system controller directing a spent solvent to said spent
15 solvent reservoir and a desired chemical product to said automated fluid collector.

16 19. (Currently Amended) The automated sequential reaction system of Claim 15, further
17 comprising a heat exchanger controllably connected to said system controller, said heat exchanger
18 ~~being coupled in fluid communication with the chemical reactor and providing a temperature-~~
19 ~~conditioned fluid that circulates through the chemical reactor, enabling~~ configured to enable the
20 system controller to control a temperature within said chemical reactor.

21 20.-27. (Currently Canceled)

22 28. (New) An automated sequential reaction system for automatically and sequentially
23 producing a substance library of different desired chemical products from a plurality of reactants in
24 accord with a programmed series of steps, comprising:

25 (a) a first automated reactant supply comprising a plurality of separate reactant
26 chambers, each adapted to be filled with a different reactant;

27 (b) a first supply valve that is automatically actuatable and is connected to the first
28 automated reactant supply to select a first desired reactant from among the plurality of separate
29 reactant chambers;

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1 (c) a reaction module coupled in fluid communication with said first supply valve,
2 such that a reactant chamber selected from within said automated reactant supply by the first supply
3 valve is placed in fluid communication with said reaction module, said reaction module including a
4 general purpose chemical reactor that is operable to produce the substance library of different desired
5 chemical products from the plurality of reactants;

6 (d) an output valve that is automatically actuatable and is coupled in fluid
7 communication with the reaction module to receive a desired chemical product, said desired chemical
8 product contributing to the substance library of different desired chemical products;

9 (e) an automated product collector in fluid communication with said output valve
10 to receive the desired chemical product and comprising a plurality of product chambers, each product
11 chamber being adapted to be filled with a different desired product to produce the substance library
12 of different desired chemical products;

13 (f) a system controller controllably connected to the first automated reactant
14 supply, the first supply valve, the reaction module, and the automated product collector, said system
15 controller being programmed to monitor and control production of the plurality of desired chemical
16 products by the automated sequential reaction system, including controlling the first supply valve to
17 select the first desired reactant, controlling said reaction module to automatically produce the desired
18 chemical product from the first desired reactant, and controlling the output valve to select a product
19 chamber into which the desired product is directed; and

20 (g) an automated detector disposed between the output valve and the reaction
21 module and coupled to the system controller, said automated detector providing an output signal to
22 the system controller that is indicative of whether a spent solvent or a desired chemical product is
23 flowing from the reaction module, said system controller responding to the output signal to actuate
24 the output valve to:

25 (i) selectively couple the reaction module in fluid communication with the
26 automated product collector if the output signal indicates that a desired product is flowing from the
27 reaction module; and

28 (ii) selectively couple the reaction module in fluid communication with a
29 spent solvent reservoir if the output signal indicates that a spent solvent is flowing from the reaction
30 module.